

U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
Reply to OA dated May 28, 2008

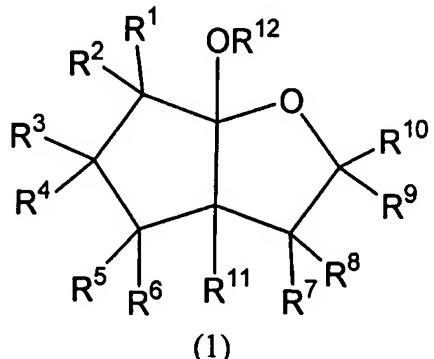
AMENDMENTS TO THE CLAIMS:

Please cancel claim 4 without prejudice or disclaimer, and amend claims 2, 3 and 7-9, as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Canceled).

Claim 2 (Currently amended): A 2-oxabicyclo[3.3.0]octane compound of the following formula (1),

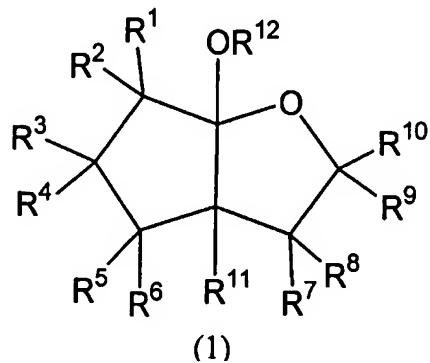


wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl

U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
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group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxy carbonyl group, a substituted or unsubstituted aryloxy carbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group, and wherein R¹² is a substituted or unsubstituted chiralic secondary hydrocarbon group.

Claim 3 (Currently amended): A 2-oxabicyclo[3.3.0]octane compound of the following formula (1),



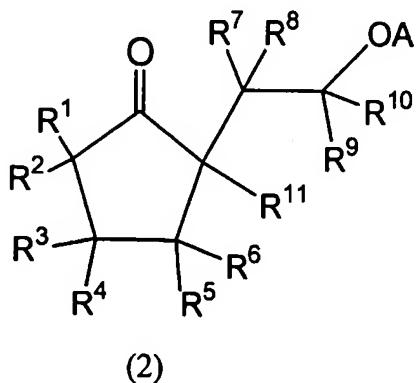
wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group,

U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
Reply to OA dated May 28, 2008

a substituted or unsubstituted alkenyloxycarbonyl group, a substituted or unsubstituted aryloxycarbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group, and wherein R¹² is a chiralic secondary hydrocarbon group having a crosslinked structure or a chiralic secondary alkyl group substituted with an alkoxy carbonyl group.

Claim 4 (Canceled).

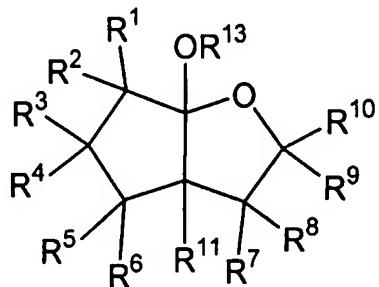
Claim 5 (Previously presented): A process for producing a 2-oxabicyclo[3.3.0]octane compound comprising reacting a cyclopentanone compound of the formula (2),



U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
Reply to OA dated May 28, 2008

wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxycarbonyl group, a substituted or unsubstituted aryloxycarbonyl group, or a substituted or unsubstituted alkenyl group and A is a hydrogen atom or a protective group for a hydroxyl group, with an optically active alcohol of the formula R¹²OH, wherein R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group, in the presence of an acid catalyst.

Claim 6 (Previously presented): A process for producing a 2-oxabicyclo[3.3.0]octane compound comprising reacting a 2-oxabicyclo[3.3.0]octane compound of the formula (3),

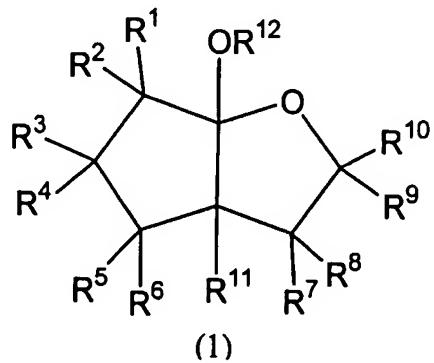


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U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
Reply to OA dated May 28, 2008

wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxy carbonyl group, a substituted or unsubstituted aryloxy carbonyl group, or a substituted or unsubstituted alkenyl group and R¹³ is a substituted or unsubstituted hydrocarbon group, with an alcohol of the formula R¹²OH, wherein R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group, in the presence of an acid catalyst.

Claim 7 (Currently amended): A method for separating a diastereomer mixture of 2-oxabicyclo [3.3.0]octane compounds of the following formula (1),

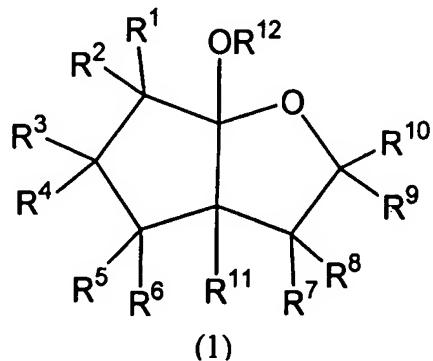


U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
Reply to OA dated May 28, 2008

wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxy carbonyl group, a substituted or unsubstituted aryloxy carbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted chiralic secondary hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group,

comprising processing the diastereomer mixture of 2-oxabicyclo [3.3.0]octane compounds of the formula (1) using a simulated moving bed chromatography to separate into individual diastereomers.

Claim 8 (Currently amended): A method for separating a diastereomer mixture of 2-oxabicyclo [3.3.0]octane compounds of the following formula (1),

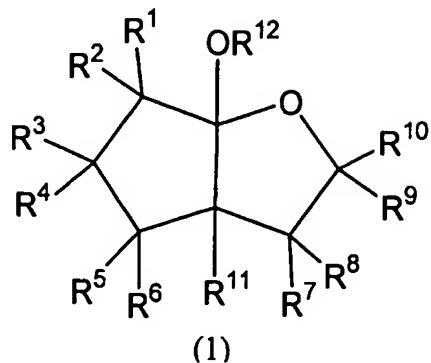


U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
Reply to OA dated May 28, 2008

wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxycarbonyl group, a substituted or unsubstituted aryloxycarbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted chiralic secondary hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group,
comprising distilling the diastereomer mixture of 2-oxabicyclo [3.3.0]octane compounds of formula (1) to separate into individual diastereomers.

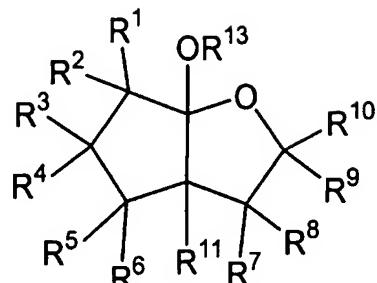
Claim 9 (Currently amended): A method for optically resolving alcohol of the formula R¹⁴OH, wherein R¹⁴ represents a substituted or unsubstituted hydrocarbon group having an asymmetric carbon atom, comprising,
a step of separating a diastereomer mixture of 2-oxabicyclo [3.3.0]octane compounds of the following formula (1),

U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
Reply to OA dated May 28, 2008



wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxy carbonyl group, a substituted or unsubstituted aryloxy carbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted chiralic secondary hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group into individual diastereomers, a step of reacting one of the separated diastereomers with an alcohol of the formula R¹³OH, wherein R¹³ is a substituted or unsubstituted hydrocarbon group, in the presence of an acid catalyst to obtain a 2-oxabicyclo[3.3.0]octane compound of the formula (3),

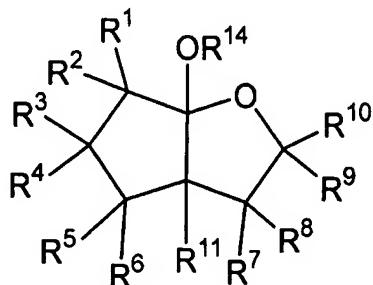
U.S. Patent Application Serial No. 10/520,282
Amendment filed October 16, 2008
Reply to OA dated May 28, 2008



(3)

wherein R¹-R¹¹ are the same as in the formula (1) and R¹³ is as defined above,

a step of reacting the compound of the formula (3) with an optical isomer mixture of alcohol of the formula R¹⁴OH, wherein R¹⁴ is as defined above, in the presence of an acid catalyst to obtain a diastereomer mixture of the formula (4),



(4)

wherein R¹-R¹¹ and R¹⁴ are the same as defined above,

a step of separating the resulting diastereomer mixture into individual diastereomers, and

a step of reacting one of the separated diastereomers with an alcohol of the formula R¹⁵OH,

wherein R¹⁵ represents a substituted or unsubstituted hydrocarbon group, in the presence of an acid

U.S. Patent Application Serial No. 10/520,282

Amendment filed October 16, 2008

Reply to OA dated May 28, 2008

catalyst to obtain an optically active alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above.

Claim 10 (Original): The method according to claim 9, wherein the step of separating the diastereomer mixture of the compound of the above formula (4) into individual diastereomers comprises processing the diastereomer mixture using simulated moving bed chromatography to separate into individual diastereomers.

Claim 11 (Original): The method according to claim 9, wherein the step of separating the diastereomer mixture of the compound of the above formula (4) into individual diastereomers comprises distilling the diastereomer mixture to separate into individual diastereomers.

Claim 12 (Previously presented): The method according to claim 11, wherein the optical active alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above, and the compound of the above formula (3) are isolated by reacting the separated diastereomer of the compound of the formula (4) with an alcohol of the formula $R^{13}OH$, wherein R^{13} is as defined above, in the presence of an acid catalyst, and the isolated compound of the formula (3) is reused as an optical resolution agent of alcohol.

Claim 13 (Previously presented): The method according to claim 9, wherein the optical active alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above, and the compound of the

U.S. Patent Application Serial No. 10/520,282

Amendment filed October 16, 2008

Reply to OA dated May 28, 2008

above formula (3) are isolated by reacting the separated diastereomer of the compound of the formula (4) with an alcohol of the formula $R^{13}OH$, wherein R^{13} is as defined above, in the presence of an acid catalyst, and the isolated compound of the formula (3) is reused as an optical resolution agent of alcohol.

Claim 14 (Previously presented): The method according to claim 10, wherein the optical active alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above, and the compound of the above formula (3) are isolated by reacting the separated diastereomer of the compound of the formula (4) with an alcohol of the formula $R^{13}OH$, wherein R^{13} is as defined above, in the presence of an acid catalyst, and the isolated compound of the formula (3) is reused as an optical resolution agent of alcohol.